



LODI CITY COUNCIL

Carnegie Forum
305 West Pine Street, Lodi

"SHIRTSLEEVE" SESSION

Date: June 16, 2009

Time: 7:00 a.m.

For information regarding this Agenda please contact:

Randi Johl

City Clerk

Telephone: (209) 333-6702

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Informal Informational Meeting

A. Roll Call by City Clerk

B. Topic(s)

B-1 Update on City of Lodi Radio Master Plan (FD)

C. Comments by Public on Non-Agenda Items

D. Adjournment

Pursuant to Section 54954.2(a) of the Government Code of the State of California, this agenda was posted at least 72 hours in advance of the scheduled meeting at a public place freely accessible to the public 24 hours a day.

Randi Johl
City Clerk



CITY OF LODI COUNCIL COMMUNICATION

AGENDA TITLE: Update City of Lodi Radio Master Plan

MEETING DATE: June 16, 2009

PREPARED BY: Michael E. Pretz, Fire Chief

RECOMMENDED ACTION: Information and discussion

BACKGROUND INFORMATION: In February 2008, staff presented Council with the City of Lodi Radio Master Plan. The purpose of the plan was to define a strategy for implementing radio communications initiatives for the next 18-36 months and to serve as a guide for future radio infrastructure purchases as well as dovetailing with the San Joaquin County Master Radio Communications Plan.

As council will recall, in 2005 the City of Lodi joined with San Joaquin County and other agencies accepted a county-wide Master Radio Communications Plan. The county-wide plan calls for across-the-board upgrades to public safety radio infrastructures and to meet new federal mandates in addition to achieving interoperable communications within the immediate region.

The City of Lodi Radio Master Plan identified specific issues and challenges faced by the City:

- The City's radio assets are old, unsupportable, and on the verge of failure. This is especially true of the City's public safety radio equipment.
- The federal government has mandated that public safety radio systems be converted to 12 kilohertz (KHz) "narrow" banding by 2013. Nearly all federal grants for radio infrastructure require digital equipment be utilized.
- The City currently utilizes different radio frequencies in nearly every department, making interoperability difficult if not impossible. Interoperability is the capability of radio units from different department and agencies to talk to one another.
- The City must secure new frequencies in order to achieve interoperability.
- Identify costs and funding sources where possible.

In the ensuing 16 months since the City of Lodi Radio Master Plan was introduced, staff has made progress toward achieving the goals described in the Plan. More specifically:

- The City is awaiting final approval from the FCC regarding new radio frequencies. Obtaining new frequencies required letters of concurrence from agencies with radio frequencies close to Lodi's new frequencies.
- Received Homeland Security grant funding to purchase police and fire department radio infrastructure equipment (\$480,151). A draft RFP is under review.

APPROVED: _____
Blair King, City Manager

- With the purchase of the above equipment, begin migration from VHF frequencies (Fire) to UHF frequencies (Police and Fire).
- Reached an agreement, in principle, with Electric Utility Department for connection to fiber optic network.
- Identified time line and cost range for full implementation.

Future steps toward the completion of this project include:

- Purchase of subscriber units (hand held and mobile radios) for Police and Fire \$753,387
- Purchase remaining City department subscriber units \$375,000
- Fiber optic switches and cable (Fire) \$ 42,500
- Consolidation of radio equipment and frequency management under one source
- Establish radio infrastructure replacement program

FISCAL IMPACT: \$1.5 million - \$2.0 million

FUNDING AVAILABLE: Unidentified

Michael E. Pretz
Fire Chief

MEP/lh

Attachment

City of Lodi

Radio Master Plan

February, 2008

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Radio Master Plan Committee Members:

- Mike Pretz, Lodi Fire Chief
- Steve Mann, Information Systems Manager
 - Kevin Donnelly, Lodi Fire Department
 - Bobby Amin, Lodi Police Department
- Mark White, Information Systems Division

Other input provided by:

- Public Works Department
- Electric Utility Department

Document Purpose:

Define a strategy for implementing radio communication initiatives over the next 18-36 months.

Background:

Three years ago the City of Lodi joined with San Joaquin County and all other county agencies in accepting a countywide Master Radio Communications Plan, which calls for across-the-board upgrades to public safety radio infrastructures. The Plan seeks to meet new Federal mandates in addition to achieving interoperable communications within the immediate region. (see Appendix E).

This document serves to implement Lodi's part of the county plan in addition to recognizing specific issues and challenges the City of Lodi is facing.

First, almost all of the City's radio assets are old, unsupportable and on the verge of failure; indeed, some critical transmitter equipment has already failed. This is especially true of the City's public safety radio equipment.

Second, the Federal government has mandated that public safety radio systems be converted to 12 kilohertz (KHz) "narrow banding" by 2013 through a plan called Project 25.

In addition, most Federal grants now require digital equipment be in place. However, digital equipment that the City may purchase today cannot be reconfigured to accommodate 6.25 KHz since that standard has not been created yet. (See Appendix D for explanation of digital v. analog).

Third, the City of Lodi currently utilizes different radio frequencies in nearly every department. For example, Police and Fire Departments broadcast on two entirely different bands, virtually eliminating the possibility of interoperability. The same is true with Public Works, Parks and Recreation, Community Center and Electric Utility. There is almost no way for departments to communicate with each other—or other nearby agencies—using our current radio systems in case of an emergency or disaster.

Fourth, the City must secure new frequencies on which to operate if the goal of interoperability is to be achieved. Ultimately, this Plan calls for the City to become part of a radio trunking system that will enable users to

easily communicate with each other in case of an emergency or disaster. (See Appendix D for explanation of trunking systems).

This document sets forth a plan to address each of these issues, including identification of the various issues, an action plan, estimated costs, and a tentative timetable for completion.

Finally, this Plan is dependent upon several factors, including funding, success in securing and licensing new frequencies, and the level of cooperation from other county agencies. Significant changes to the proposed timetable and action steps are possible before the Plan is fully implemented. As is normally the case, costs also tend to increase over time. Any significant delays in implementation may result in higher actual costs.

Clearly, time is of the essence. As an equipment failure may be imminent, the City must resolve to act quickly and deliberately in order to avoid a potentially disastrous communications breakdown in its public safety sector.

Goals

- Replace Fire main channel analog transmitter
- License VHF frequencies for Fire Tactical channel
- Establish Lodi Fire TAC channel on a base station
- Pursue narrow-band UHF letters of concurrence from other agencies
- License narrow-band UHF frequencies
- Purchase new UHF equipment for Fire and police and possibly other city departments
- Pursue Interoperability with other county agencies
- Establish a radio equipment replacement policy
- Meet FCC 12KHz narrow banding mandate
- Provide enhanced bandwidth for Police & Fire Mobile Data Computers (MDC)
- Utilize existing City owned fiber optic network to enhance communications between City facilities

- Consolidate city's FCC Federal Registration Numbers (FRN) into one

Needs Assessment

Critical Needs

1. Replace the Fire department's failing radio equipment; current Fire radio transmitters are the same age as the Police Channel 1 equipment that failed and was replaced
2. License UHF 460MHz frequencies
3. Replace the Police department's Channel 2. The radio transmitter is the same age as the old Police Channel 1 equipment, which failed and was replaced in 2007.
4. Radio Room Roof repairs or redesign

Intermediate Needs

1. Police and Fire MDC (Mobile Data Computers) –add broadband wireless access through a commercial wireless data network provider
2. Migration of Public Safety onto UHF to reduce the number of systems required to be maintained by property owner under the City standard for communications inside of large buildings (over 50,000 sqft)
3. A new fire station #5 will be constructed in the southeast part of Lodi in the near future. We need to add this information to the needs assessment for the Fire Department: Fire station #5 radio base station and voter/receivers equipment, engine radio, and the appropriate number of portable radios for new personnel

Long Term Needs

1. Migrate all departments to UHF 460MHz frequencies
2. Replacement of radio tower and associated communication room
3. Move the Police and Fire voter/receiver equipment from the Woodbridge Fire station located outside of the northwest city limits of Lodi to Fire Station #4
4. Utilize the existing City of Lodi, Electric Utility department fiber optic ring to network City facilities for data, voice, and radio communications

Implementation Path

1. Replace Lodi Fire main channel one

- A. Purchase a radio voter system that can be switched between either analog or digital mode and is 12.5KHz narrow band capable
- B. Use existing portable and mobile radio equipment that is 12.5KHz narrow band capable
- C. As needed, purchase additional portable and mobile radio equipment that is 12.5KHz narrow band and digital capable

2. Replace Lodi Fire tactical (TAC) channel

- A. Purchase a radio voter system that can be switched between either analog or digital mode and is 12.5 KHz narrow band capable
- B. Use existing portable and mobile radio equipment that is 12.5KHz narrow band capable

3. License UHF 460MHz frequencies

- A. Research available un-used interstitial 'gap' narrow band 460MHz frequencies
- B. Secure letters of concurrency from agencies using 460MHz frequencies adjacent to available 'gap' narrow band frequencies
- C. Contract with consultant to prepare FCC application forms

4. Migrate Lodi Fire main frequency to UHF 460Mhz

- A. Obtain UHF 460MHz frequencies from the City of Stockton
- B. License UHF 460MHz frequencies from available narrow band

5. Meet FCC narrow banding mandate

- A. Check with current contracted radio support vendor and verify both VHF and UHF transmitter equipment that they are 12.5KHz narrow band capable
- B. Replace/update equipment as needed before 2013

6. Migrate all departments to UHF 460MHz system

- A. Pending availability of 460MHz UHF frequencies

7. Pursue Interoperability with other county agencies

- A. Pending San Joaquin County regional frequencies cover-area report

- B. Pending funding and subsequent deployment of a regional trunked radio system

8. Establish a radio equipment replacement policy

- A. Develop a policy similar in concept to the City's vehicle replacement policy

9. Meet FCC 12KHz narrow banding mandate by 2013

- A. The FCC, using Association of Public Safety Communications Officials International's (APCO) Project 25 as a guideline (see Appendix A), mandates that Public Safety radio systems be narrow banded to 12.5KHz by 2013
- B. Does not require purchasing digital capable radio equipment, but most Federal grants require purchasing digital equipment as part of the plan

10. Consolidate city's FCC Federal Registration Numbers (FRN)

- A. Apply to the FCC requesting that they consolidate all frequencies currently licensed by the City of Lodi under one master FRN

11. Utilize existing City owned fiber optic network to enhance communications between City facilities

- A. Working with the Electric Utility Department, develop a plan, independent of this document, to address utilization of the city-owned fiber optic circuit for the purpose of improving communications between city sites

Implementation Timeline and milestones

| | |
|---|---------|
| Replace Fire main channel 1 with analog/digital capable radio voter system –0 to 2 months | 4/20/08 |
| FCC Licensing process frequencies for Fire Tactical channel –2 to 12 months | 4/30/08 |
| Establish Lodi Fire TAC channel on an analog/digital capable radio voter system –2 to 12 months | 6/30/08 |
| Pursue narrow-band UHF letters of concurrence from other agencies –0 to 2 months | 6/30/08 |
| Establish a radio equipment replacement policy – | |

| | |
|---|----------|
| 3 to 6 months | 6/30/08 |
| License narrow band UHF frequencies – 2 to 12 months | 6/30/09 |
| Purchase new UHF equipment for Police – 6 to 24 months | 12/31/09 |
| Pursue Interoperability with other county agencies – 2 to 5 years | 12/31/10 |
| Meet FCC established January 1, 2013 deadline for migration to 12.5 KHz technology | 12/31/10 |

Estimated Costs:

| | | | | | | |
|---------------------------------------|---|-----------|--|--|--------------|--------------|
| Initial Needs Assessment (CSI) | | | | | \$7,000.00 | |
| | | | | | | |
| Licensing per Channel (4) | | | | | \$3,200.00 | |
| | | | | | | |
| Replacement Fire | | | | | | |
| | Fire VHF Channel 1 (narrow band capable) | | | | \$110,000.00 | |
| | Fire VHF Channel 2 (narrow band capable) | | | | \$110,000.00 | |
| | Fire VHF subscriber units (radios) | | | | \$100,000.00 | |
| | | Sub total | | | | \$320,000.00 |
| | | | | | | |
| Migration | | | | | | |
| | Fire UHF Channel 1 digital capable | | | | \$110,000.00 | |
| | Fire UHF Channel 2 digital capable | | | | \$110,000.00 | |
| | Fire UHF subscriber units (radios) | | | | \$100,000.00 | |
| | | Sub total | | | | \$320,000.00 |
| | | | | | | |
| Replacement Police | | | | | | |
| | Police UHF Channel 2 | | | | \$110,000.00 | |
| | Police subscriber units | | | | \$200,000.00 | |
| | | Sub Total | | | | \$310,000.00 |
| | | | | | | |
| Upgrade | | | | | | |
| | Police and Fire to Trunked Radio System | | | | \$100,000.00 | |
| | | Sub total | | | | \$100,000.00 |
| | | | | | | |
| Replacement | | | | | | |

| | | | | | | | |
|--|---|--|-----------|--|--|--------------|--------------------------------------|
| | Remaining City Department subscriber units (radios) | | | | | \$375,000.00 | |
| | | | Sub total | | | | \$375,000.00 |
| | | | | | | | |
| City-wide trunk UHF system infrastructure | | | | | | | \$1.5 Million - \$2.0 Million |
| | | | | | | | |

Funding:

Funding source is to be determined.

Appendix A: Project 25

Project 25

Project 25 (P25) was established to address the need for common digital public safety radio communications standards for First Responders and Homeland Security/Emergency Response professionals.

P25 is a set of standards produced through the joint efforts of the Association of Public Safety Communications Officials International (APCO), the National Association of State Telecommunications Directors (NASTD), selected Federal Agencies and the National Communications System (NCS), and standardized under the Telecommunications Industry Association (TIA). The P25 suite of standards involves digital Land Mobile Radio (LMR) services for local, state/provincial and national (Federal) public safety organizations and agencies.

The objectives of Project 25 are:

- To maximize spectrum efficiency
- To ensure competition in life cycle procurements
- To allow effective and efficient inter- and intra-agency communications;
- To provide “user-friendly” equipment and operation.

The Federal government (including Department of Defense for base operations) has mandated Project 25 for its digital systems throughout the U.S. Likewise, the American Association of Railroads has standardized on Project 25 for all railroads in North America.

In 1989, APCO, the National Association of State Telecommunications Directors, and a group of Federal agencies jointly formed a working group called Project 25 (or P25) to undertake development of a series of standards to define a digital radio system (conventional and trunked). Completed standards include conventional and trunked radio for phase I (12.5 kHz bandwidth) and Phase II (6.25 kHz bandwidth) FDMA architectures. Work is in progress on TDMA standards for 12.5 kHz (2-slot) and 25 kHz (4-slot) TDMA architectures.

Services defined include digital voice address including individual, group, and broadcast calls; circuit data including protected and unprotected data; packet data; and a set of nine supplementary services including encryption. Both conventional and trunked air interface specifications are included. The specification will be used for unit-to-unit direct communications, base station to limited field units, multisite simulcast,

voting receiver systems, and wide and local area trunking at frequencies from 100 to 1000 MHz.

High on Project 25's list of requirements is a common air interface (CAI) between systems of different manufacturers enabling interoperability. In addition, there are common interfaces spelled out for the data port for laptop and other terminals, the host computer and other networks, the public telephone system interconnect, the network manager, and for connecting multiple systems (inter-system). Thus, competing companies may design their own offerings provided the common interface requirements are met.

After a number of different systems were investigated, the committee chose an FDMA access scheme proposed by Motorola, Inc. The scheme initially involved 12.5 KHz channel bandwidth, later to migrate to 6.25 KHz bandwidth.

A migration strategy has been defined in Project 25 that allows forward migration to 6.25 KHz bandwidth and backward migration to 25 KHz trunked radio systems, including the APCO Project 16 systems. The system is heavily software driven, and Motorola has licensed its scheme and software to other vendors without royalties so that other vendors may produce Project 25 compliant systems in competition with them.

The 12.5 KHz air interface has been published, although the data port, data host, and network management interfaces are still being worked on.

P25 Key target dates

Reference: <http://www.apcointl.org/frequency/documents/NarrowbandOrder.html#nbqa>

NARROWBAND 150-512 MHz

Narrowbanding Notice Released 12-23-2004 by FCC.

FCC executive summary of the order:

- FCC establishes January 1, 2013 deadline for migration to 12.5 KHz technology.
- Applications for wide band operations (25 KHz channels) will be accepted until January 1, 2011.
- Application for modification of operations that expand the authorized contour of an existing station using 25 KHz channels will be accepted until January 1, 2011. (Also applies to "new" systems submitted for licensing.)
- Manufacture and importation of any equipment on 25 KHz channel will be permitted until January 1, 2011.
- Part 90 paging-only frequencies are exempt from this ruling.

What This Means to Radio Users

All existing Part 90 radio systems operating on frequencies between 150-512 MHz have eight years to convert those systems either to 12.5 kHz bandwidth or to a technology that provides one voice path per 12.5 kHz of bandwidth or provides a data rate of 4800 bps/6.25 kHz.

12.5 kHz Conversion Deadline for Existing VHF/UHF Systems

- Industrial/Business Pool licensees conversion deadline remains January 1, 2013
- Public Safety Pool licensees conversion deadline has been changed to January 1, 2013
 - After this date, all systems must have converted either to 12.5 kHz bandwidth or to a technology that provides one voice channel per 12.5 kHz or operates at a data rate 4800 bps per 6.25 kHz of bandwidth.

Interim Deadlines for VHF/UHF Systems & Equipment

- New applications for 25 kHz bandwidth will be accepted until January 1, 2011
 - After this date, applications for greater than 12.5 kHz bandwidth will be accepted only if the equipment meets the efficiency standard of one voice channel/12.5 kHz bandwidth or 4800 bps/6.25 kHz (9600 bps for 12.5 kHz; 19.2 bps for 25 kHz)
- Modifications of existing 25 kHz systems will be accepted until January 1, 2011
 - After this date, applications to modifications to 25 kHz systems which result in an expanded service contour will be accepted only if the equipment meets the efficiency standard of one voice channel/12.5 kHz bandwidth or for data, 4800 bps/6.25 kHz (9600 bps for 12.5 kHz; 19.2 Kbps for 25 kHz)
- 25 kHz equipment can be manufactured and imported until January 1, 2011
 - After this date, equipment operating at greater than 12.5 kHz bandwidth must meet the efficiency standard of one voice channel/12.5 kHz bandwidth or 4800 bps/6.25 kHz.
- 90.203(j) has been amended to allow certification of equipment operating at 25 kHz after January 1, 2005 if it meets the efficiency standards listed above. Effective date of 90.203(j)(5) has been stayed until the FCC releases a decision on the Manufacturers Petition for stay. (See next article).

The FCC also revised its rules to exempt Part 90 paging-only frequencies from the narrow banding requirements.

P25 Basic Questions & Answers

Q - Will we have to buy new radios?

A - Depends. Most radios purchased in the last 6-8 years are already narrowband capable. They only need to be re-tuned.

Q – Will we need to change frequencies?

A – No. You merely reduce the bandwidth of the channel(s) you are now using.

Q – Will that reduce our coverage?

A – Little if any. You may have to survey your system and area of operation. Only a thorough analysis of your coverage requirements can tell for sure.

Q – Will we have to convert to digital?

A– No. However, many agencies are using this opportunity to upgrade to digital technology. Most digital radios are dual mode capable and can operate in wide band analog as well as narrowband analog and digital. Digital is also more immune from adjacent channel interference along with features unavailable in analog.

Q – We do not have the money to move to narrowband. Isn't this an unfunded mandate?

A– Note really. The dates are extended enough to ensure most agencies have fully amortized the value of their current equipment by the time the mandates kick in.

Q - We have a data system. Won't this reduce our throughput?

A - Data systems must meet the 4800 bps/6.25 kHz equivalency. If your current 25 kHz system sustains 19.2 Kbs at 25 kHz, you may continue to use it and expand coverage area.

Appendix B: Initial findings from CSI

Initial findings from outside consultant CSI Telecommunications based on submitted needs assessment forms (November 2007).

Fire

It appears that there are no repeaters for the Fire Department. Two frequencies [confidential] MHz are MO (Mobile) only and one frequency [confidential] MHz is FB (Base) and MO. That license also has Fire White [confidential] MHz as an FB. The two FB's are located at 210 W Elm St. Lodi may be small enough so that everybody can talk to everybody direct without a repeater although there may be issues with portable radios. Generally the fire service uses portables only at the scene of a fire (Fire Ground) and the rest of the time they mostly use radios in vehicles with higher power and better antennas. If there are any base stations at any other locations they are not licensed. Hint: Check each fire station. My guess is you will find a base station there. FCC Rules state that any transmitter connected to an antenna mounted to a building is defined as a "Base Station" even though the radio itself might be a "mobile radio". All Base Stations must be licensed per FCC Rules. Voting receivers feeding the dispatcher are not licensed and will not show up on a paper license search.

Police

The Police Department uses two UHF frequency pairs [confidential] MHz and [confidential] MHz for voice communications and one 800 MHz pair ([confidential] MHz moving to [confidential] MHz) for MDT. The base stations are located at 230 W Elm Street. Interesting to note that the base stations are licensed as FB2 (repeater) but no control station (FX1) or base station (FB) for the dispatcher. If the base station is keyed directly by the dispatcher then it must be also licensed as an FB.

Public Works

Public Works is licensed with one [confidential] MHz pair with the base at 230 W Elm Street. They appear to also use a LTR trunked system through Knox LaRue Communications.

Parks Department

The Parks Department has two VHF simplex frequencies [confidential] and [confidential] MHz with the base station for both frequencies at 125 N Stockton St.

Utility Department

The Utility Department has one [confidential] MHz repeated frequency with the FB2 (base repeater) at 210 W Elm St but also an FB (base station) on the repeater output frequency [confidential] MHz at 1221 S Ham Ln. No

control station (FX1) to the FB2 is licensed. They also have a 2 W MO only frequency [confidential] MHz.

Initial Thoughts

Having the Lodi city departments on different frequency bands and different technologies (conventional mostly except for LTR trunking in Public Works) makes it impossible to have full interoperability throughout the city. In the perfect world moving all city radio users to one frequency band and technology would be the first choice but reality is there is no band available right now (although 700 MHz could be an option in the future) and the cost of replacing all of the city's radios would be significant. On a day to day basis most radio communications is within one department. Although all reported a desire to communicate with other departments nobody really identified this as a critical issue. Exactly how Lodi responds to an event and coordinates Police, Fire, and Public Works at that event needs to be investigated.

The main city tower is sometimes located at "210 W Elm St" or at "230 W Elm St". There are slight discrepancies between different licenses at this location. This is a paperwork housekeeping issue.

The licenses themselves are sent to various departments. There is a high risk to losing one because a renewal is not noticed. Ideally one city agency should be designated as the responsible party for all licensing.

One thing that really stands out is that Lodi has almost as many FRN's as licenses. There should be ONE and ONLY ONE FRN for any entity.

In summary Lodi has existed with what they have and probably could continue to exist into the future. Enhancements like repeating in the fire service or a third channel for the police or improving interoperability can be investigated if desired.

Appendix C: Departmental Needs Assessments

Submitted in November 2007

Lodi Fire Department
Communications Needs Assessment Outline
November 2007

Department Name

Fire

Department Functions

Emergency Response and Preparedness

Number of people in the Department

64

Number of people on duty at any given time in the Department

18 - 26

Department Work Schedule

24/7

Number of vehicles in the Department

19

Internal Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in your department?

Operations

All staffed field units (6),

Training

Fire prevention

Category 2

For known special events who in your department needs to talk to someone else in your department?

Operations

All staffed field units (6), Fire Inspector, Fire Marshal

Training

Fire prevention

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in your department?

Everyone

All staffed field units (6), 3 Administration staff units, Fire Inspector, Fire Marshal Additional units as staffed by recall

External Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

LPD

Public Works

EUD

Stockton Fire

LifeCom

County Fire agencies

Ambulance provider (AMR)

Air Ambulance

Category 2

For known special events who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

LPD

Public Works

Parks

Stockton Fire

LifeCom

County Fire agencies

Ambulance provider (AMR)

Air Ambulance

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in what other department(s)?

List other departments, both in your organization and external to your organization.

- LPD
- Highway Patrol
- Sheriff
- Public Works
- EUD
- Parks
- Stockton Fire
- LifeCom
- CalTrans
- EBMUD
- Air Ambulance
- County Fire agencies
- Hospitals
- State Fire Agencies and OES
- Ambulance provider (AMR)
- City EOC
- County OES
- Coast Guard
- State Fish and Game

What communications resources are available to your department?

- Licensees for one paired repeated Channel VHF and two non-repeated VHF
- City and county Radio infrastructure
- Stockton Fire Radio Frequencies and infrastructure
- Cell phones
- Pagers
- State White
- County VHF Frequencies
- CalCord

2 – Base transmitters

4 – Voting Receivers

40 – (approx) Portable Radios

20 – (approx) Mobile Radios 18 VHF 2 UHF

15 - (approx) Radio Pagers

15 - (approx) Cell Phones

Computers for radio programming along with the needed adapters and software.

Lodi Police Department
Communications Needs Assessment Outline
November 2007

Department Name

Lodi Police Department

Department Functions

Law Enforcement Services

Number of people in the Department

78 Sworn

39 non sworn

5 Part time

Approximately 120 volunteers

Number of people on duty at any given time in the Department

Anywhere from 8 to 70

Department Work Schedule

Various schedules

24 hour 7 day a week operation

8, 9, 10 and 12 hour shifts

Number of vehicles in the Department

Approximately 60

Internal Department Communications

Category 1

Dispatchers, Police Officers, Detectives, Traffic Services Officers,
Supervisors and Volunteers

Category 2

Same as above

Category 3

Nearly all sworn personnel and volunteers

External Department Communications

Category 1

Dispatchers, Officers and supervisors daily.
Public works, City Hall, Electric Utility etc..

Category 2

Same as above

Category 3

All departments

What communications resources are available to your department?

We have UHF radio systems and are in the process of switching one over to digital capable. We use mobile and portable radios to talk to one another as well as the communication center.

We can also communicate via MDCs.

We also utilize pagers and cell phones.

Lodi Public Works Department
Communications Needs Assessment Outline
November 2007

Department Name

Public Works

Department includes the following divisions:

- Engineering
- Fleets & Facilities
- Streets & Drainage
- Transit
- Water- Wastewater

Department Functions

- **Engineering** – The Engineering Division plans, designs and oversees construction of city streets, water, wastewater and drainage systems in conformance with the General Plan, capital improvement budget and development policies and provides engineering services for many other city departments and special projects.

- **Fleets & Facilities** – Fleet Services maintain a fleet of approximately 420 vehicles and equipment serving the entire City fleet. Included are repairs to vehicles and equipment of all types and sizes; managing the parts inventory; troubleshooting and repair of problems. Facilities Services maintain and manages all City facilities except Parks and Recreation and Hutchins Street Square facilities; administers construction projects, primarily for building remodels and renovations; and supervises contract labor and vendor for janitorial and other building maintenance services.
- **Streets & Drainage** - The Street Maintenance activity includes the administration and management support for the Streets & Drainage Division, which provides management and maintenance for the following: streets, alleys, street trees, storm water, curbs, gutters, sidewalks; traffic control signs, street markings, street sweeping.
- **Transit** – Transit provides a daily fixed route bus system within the City limits and a door to door “Dial-A-Ride” service for the General Public.
- **Water- Wastewater** – Water activity provides potable water to approximately 23,000 residential, commercial and industrial customers. The utility provides water for fire suppression to both public and private fire hydrants and fire suppression systems. Wastewater activity includes the operation of the White Slough Pollution control Facility which treats the City’s wastewater to tertiary levels and is located approximately 6 miles west of town, and the maintenance of wastewater pipelines and lift stations that convey wastewater to the treatment plant.

Number of people in the Department

- | | |
|-----------------------|----|
| • Engineering | 21 |
| • Fleets & Facilities | 15 |
| • Streets & Drainage | 29 |
| • Transit | 25 |
| • Water- Wastewater | 41 |

Number of people on duty at any given time in the Department - Same

**Department Work Schedule Normal Schedule is Mon – Fri 6:30 – 5:00
(Fleets swing shift 2:30 – 10:30)**

Number of radios in the Department

- | | |
|---------------|---|
| • Engineering | 3 |
|---------------|---|

- Fleets & Facilities 5
- Streets & Drainage 31
- Transit 27
- Water- Wastewater 33

Internal Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in your department? All of the above. Streets needs to be able to talk to Water or Fleet etc... Need to be able to routinely communicate with Lodi Control. The exception is Transit is a stand alone.

Category 2

For known special events who in your department needs to talk to someone else in your department? Ditto above.

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in your department? Ditto above plus Safety (Fire & Police dispatch at a minimum)

External Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in what other department(s)? (Dispatch at Lodi Control EUD). List other departments, both in your organization and external to your organization. Same as Internal Category 3.

Category 2

For known special events who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization. Same as Internal Category 3

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization. Same as Internal Category 3

What communications resources are available to your department?

The City of Lodi Public Works Department has an [confidential] MHz two-way truncated radio system that is used in day-to-day operations. There are approx. 70 radios, 58 being mobile radios and the other 12 are portable radios. The majority of them are Motorola radios; however, we have found that the Kenwood radios are more compatible to the syntor radios that were previously in the superintendent's vehicles. We have since replaced a few vehicles and portables with kenwood radios.

Our present radio contract is with Knox Larue Communications, which provides maintenance for the [confidential] MHz LTR trunking system. Channels 1 and 2 come from the Bear Mountain tower, channel 3 is backup from Mt. Oso and channel 4 works off the existing City of Lodi repeater. The City of Lodi repeater is located at the police station tower site. All mobile radios are equipped with a horn honking capability.

***Parks & Recreation Part 1
Communications Needs Assessment Outline
November 2007***

Tuesday, August 14, 2007

Department Name

- **Parks & Recreation Department**

Department Functions

- **Maintain city parks & offer recreation opportunities to the citizens of Lodi**

Number of people in the Department

- **30 full time. Part time – Approx. 8 Parks laborers, + sports officials, scorekeepers, After School Program coordinators, etc. - Minimum of 40 and Maximum of 80**

Number of people on duty at any given time in the Department

- **Approx. 40**

Department Work Schedule

- **7 days a week**

Number of vehicles in the Department

- **22**

Internal Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in your department?

- Director
- Superintendent
- Supervisors – 2
- Maintenance Workers III – 5
- Maintenance Workers I and II – 11
- Mechanic
- Senior Facilities Maintenance Worker
- Project Coordinator
- Program Coordinator
- Recreation Supervisors – 4
- ASP Coordinators - 12
- Parks Admin. Support Person (Secretary)
- Recreation Office Staff – (1 radio for the office)

Category 2

For known special events who in your department needs to talk to someone else in your department?

- All of the above

Category 3

For critical unscheduled events (i.e., “The 100 Year Flood”) who in your department needs to talk to someone else in your department?

- All of the above

External Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

- Recreation – Parks
- Hutchins Street Square
- Public Works – Streets, Water Wastewater, Engineering, etc.
- Police
- Fire
- Animal Control

Category 2

For known special events who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

- All of the above

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

- All of the above

What communications resources are available to your department?

- Nextel radios/cell phones
- Motorola two way radios
- Telephone
- E-mail

Parks & Recreation Part 2 (HSS Community Center) Communications Needs Assessment Outline

Department Name

Hutchins street square

Department Functions

Provide Arts classes
Facility Rental
Theatre
Pool
Day care
Adult daycare

Number of people in the Department

7 fulltime
7 part time
numerous volunteers

Number of people on duty at any given time in the Department

Average 12

Department Work Schedule

7 days a week

Number of vehicles in the Department

one

Internal Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in your department?

- | | | |
|-------------|-----------------|----------------|
| 1.director | 4.Arts liason | 7.Events coord |
| 2.Admin sec | 5.Senior center | |
| 3.Arts cord | 6.Maint x2 | |

Category 2

For known special events who in your department needs to talk to someone else in your department? See above

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in your department?

All the above

External Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

Police

Fire

PW

Parks

Animal control

Category 2

For known special events who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

See above

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

See above

What communications resources are available to your department?

Cell phones

Two way Radio

Nextel will not work at the square

Email

Telephone

***Electric Utility Department
Communications Needs Assessment Outline***

Department Name

Electric Utility department

Department Functions

Construction and maintenance electric system for City of Lodi. Operations of electric, water, waste water system

Number of people in the Department

40

Number of people on duty at any given time in the Department

30-35

Department Work Schedule

Sunday thru Saturday

Number of vehicles in the Department

24

Internal Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in your department?

40

Category 2

For known special events who in your department needs to talk to someone else in your department?

40

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in your department?

40

External Department Communications

Category 1

On a day-to-day basis who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization.

Department head, mid managers, supervisors, operations personnel, need to coordinate with public works, fire, police

Category 2

For known special events who in your department needs to talk to someone else in what other department(s)? List other departments, both in your organization and external to your organization. Department head, mid managers, supervisors, operations personnel, need to coordinate with public works , fire, police

Category 3

For critical unscheduled events (i.e., "The 100 Year Flood") who in your department needs to talk to someone else in what other department(s)?

List other departments, both in your organization and external to your organization. Department head, mid managers, supervisors, operations personnel, need to coordinate with public works , fire, police

What communications resources are available to your department?

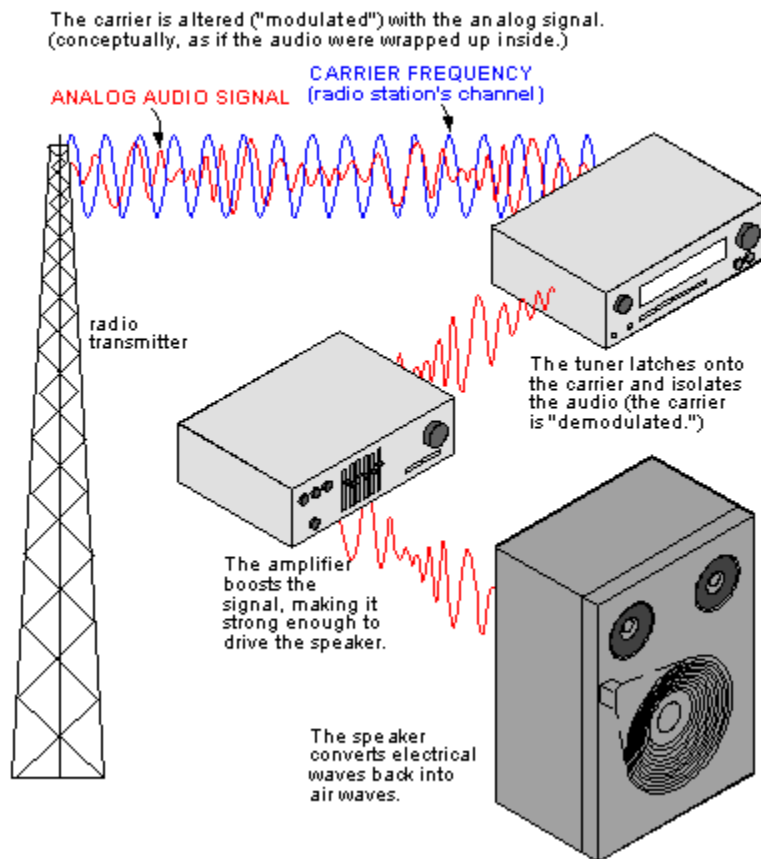
Analog phone, interoffice phone system, radio, internet, intranet, cell phone.

Appendix D: Analog v. Digital signals

Analog Systems

In traditional analog radio, the original sound waves are maintained as analogous electrical waves throughout the entire chain from microphone to speakers. The analog waves are transmitted over the air in the radio station's channel frequency, which is called a "carrier." The carrier is altered (modulated) to contain the analog waves as if wrapped within conceptually.

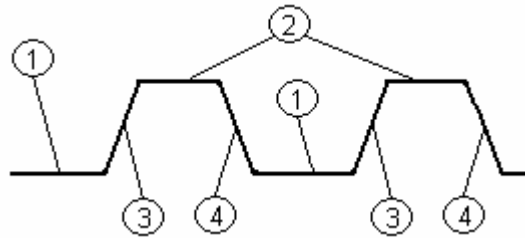
From Computer Desktop Encyclopedia
© 2007 The Computer Language Co. Inc.



Digital signals

A digital signal is one in which the original information is converted into a string of bits (0 or 1) before being transmitted. A radio signal, for example, will be either on or off. Digital signals can be sent for long distances and suffer less interference than Analog signals. The communications industry worldwide is in the midst of a switch to digital signals.

Digital signal:



1) Low level, 2) High level, 3) Rising edge, and 4) Falling edge

Advantages and disadvantages to analog radio:

- Advantage: In high-quality equipment, better ability to communicate in cases where a received signal is weak or noisy.
- Disadvantage: Only one conversation at a time can occur on each channel.

Advantages and disadvantages to digital radio:

- Advantage: More simultaneous talking paths are possible and information such as unit ID, status buttons, or text messages can be embedded into a single digital radio channel.
- Disadvantage: Radios must be designed to the same, compatible standard, radios can become obsolete quickly, cost more to purchase, and are more complicated.

Trunked Radio Systems

In a trunked radio system, the system logic automatically picks the physical radio frequency channel. There is a protocol that defines a relationship between the radios and the radio backbone which supports them. The protocol allows channel assignments to happen automatically.

Digital trunked systems may carry simultaneous conversations on one physical channel. In the case of a digital trunked radio system, the system also manages time slots on a single physical channel. The function of carrying simultaneous conversations over a single channel is called multiplexing.

Instead of channels, radios are related by groups which may be called, groups, talk groups, or divided into a hierarchy such as fleet and subfleet, or agency-fleet-subfleet. These can be thought of as virtual channels which appear and disappear as conversations occur.

Systems make arrangements for handshaking and connections between radios by one of these two methods:

A computer assigns channels over a dedicated control channel. The control channel sends a continual data stream. All radios in the system monitor the data stream until commanded by the computer to join a conversation on an assigned channel.

Electronics embedded in each radio communicate using a protocol of tones or data in order to establish a conversation, (scan-based).

If all physical channels are busy, some systems include a protocol to queue or stack pending requests until a channel becomes available.

Some trunked radios scan more than one talk group or agency-fleet-subfleet. Visual clues a radio may be trunked include the 1) lack of a squelch knob or adjustment, 2) no monitor button or switch, and 3) a chirp (made infamous by Nextel) showing the channel is available and ready at the moment the push-to-talk is pressed.

Source: Answers.com

Appendix E: Regional Communications Master Plan Agreement

MASTER RADIO COMMUNICATIONS PLAN SAN JOAQUIN OPERATIONAL AREA

Supporting the Jurisdictions of:

**San Joaquin County, City of Stockton, City of Ripon,
City of Lodi, City of Tracy, City of Manteca, City of
Lathrop, City of Escalon and 13 Rural Fire Districts**



January 7, 2005

INTRODUCTION

Geography

The County of San Joaquin was established by an act of the State Legislature on February 18, 1850 as one of California's original 27 Counties. Situated in the Central Valley portion of the State, the County covers 1,448 square miles. The County seat is located in the City of Stockton.

San Joaquin County is located in north central California in the Great Central Valley between the Diablo Mountain range and the Sierras. The County is flat farmland broken by foothills in the east and Mt. Boardman in the west.

There are seven incorporated cities in the County and a number of unincorporated communities. The cities of Escalon, Lathrop, Lodi, Manteca, Ripon, Stockton, Tracy and unincorporated communities of French Camp, Farmington, Linden, Lockeford, Thornton, Clements make up the population base of 623,000.

The flatland surrounded by foothills creates a challenge for developing emergency communications systems that support the Public Safety infrastructure.

MASTER COMMUNICATIONS PLAN STEERING COMMITTEE

The San Joaquin Operational Area Master Communications Plan has been developed, and is being implemented, through an executive steering committee. The County of San Joaquin, along with all incorporated cities and public safety special districts, have representatives on the Master Communications Planning Committee. The County provides administrative and technical support to the committee. The mission of the committee is to meet the goals established in this plan. Approval of this Master Plan by the committee included agreement on the strategy of 1) using a Public Safety trunked radio system and 2) sharing existing resources of all jurisdictions as the basis for accomplishing plan goals.

MASTER COMMUNICATIONS PLAN GOALS

- A. Address the Federal Communications Commission (FCC) mandated migration to the digital communications platform (APCO Project 25) by January 1, 2013.
- B. Provide interoperable communications between public safety and general government agencies for emergency communications in daily activities and disaster situations.

COMMUNICATIONS SYSTEM BACKGROUND

The County and agencies within the County do not currently have the capability to communicate with each other because they operate on different radio frequencies. In addition, all analog equipment within the County operating at 25khz bandwidth is not compliant to the new digital standards. (APCO Project 25)

San Joaquin County operates its Public Safety Communications System through a backbone of communications sites located at the following locations:

| | | |
|------------------|----------------|--------------------------|
| French Camp | Oak Grove Park | Ripon Fire Department |
| City of Manteca | City of Tracy | Clements Fire Department |
| City of Stockton | Farmington | Escalon Fire Department |
| Mount Oso | Bear Mountain | County Courthouse |
| City of Lodi | | |

A SONET ring microwave system connects the communications sites to city dispatch centers and the Sheriff's Communication Center located in French Camp. The current microwave system is located at French Camp, Oak Grove Park, City of Manteca, County Courthouse, Bear Mountain, Mount Oso, City of Tracy, City of Lodi, and Farmington. The system needs to be expanded to include Ripon and Clements Fire Districts. This will provide an infrastructure that supports a higher level of communications coverage in the extreme north and south ends of the County.

The primary radio frequency spectrum used by the County is 450mhz. Radio repeaters located at high level mountain top sites on Mount Oso in Stanislaus County and Bear Mountain in Calaveras County provide countywide coverage for the Sheriff's Office dispatch on two main channels. The third dispatch channel uses a recently installed four-site low level digital simulcast radio communications system. Elements of this low level system were obtained through previous Homeland Security Grants. The high level sites operate in the analog mode which is not Project 25 compliant and needs to be upgraded to the FCC digital standards. The low level digital simulcast system is scalable to 6.25khz bandwidth and is Project 25 compliant. The establishment of the low level digital system allows for future expansion that can accommodate the communications needs of all public safety and general government agencies within the County. Such a system could be used independently during day-to-day operations and rapidly made interoperable between separate jurisdictions for Homeland Security and disaster response needs. The system would also have the capability of operating in the conventional mode to establish interoperability with outside governmental agencies.

Current radio systems in operation within the County are as follows:

| | |
|-------------------------------|--|
| San Joaquin County | - 450mhz analog, digital scalable to 6.25khz |
| City of Stockton | - 450mhz analog, digital scalable to 6.25khz |
| City of Lodi Police | - 450mhz analog, 25khz scalable to 12.5khz |
| City of Lodi Fire | - 150mhz analog, 25khz only |
| City of Manteca Police & Fire | - 150mhz analog, 25khz only |
| City of Tracy Police & Fire | - 150mhz analog, 25khz only |
| City of Ripon Police & Fire | - 150mhz analog, 25khz only |
| City of Lathrop Police | - 450mhz analog/digital, scalable to 6.25khz |
| City of Lathrop Fire | - 150mhz analog, 25khz only |
| City of Escalon Police & Fire | - 150mhz analog, 25khz only |
| 13 Rural Fire Districts | - 150mhz analog, 25khz only |
| EMS/Ambulance | - 150mhz and 450mhz analog, 25khz only |

All agencies currently share communications sites and infrastructure resources.

MASTER PLAN INTERMEDIATE OBJECTIVES WITH IMPLEMENTATION STRATEGIES/TASKS

Objective #1: Identify a pre-implementation strategy and assign working sub-committees.

Task: Implement engineering studies to define coverage and performance to identify communications site and equipment requirements.

Task: Define phases for implementation over future budget years based on reasonable expectations of funding.

Task: Develop channel utilization policies and disaster communications plans for ensuring rapid and effective interoperable, multi-jurisdictional, communications when needed.

Task: Develop channel utilization policies for day-to-day operation.

Task: Develop disaster communications plans for rapid, controlled, and effective transition to interoperable, multi-jurisdictional, communications as required by the event or situation.

Task: Develop and implement a training program for dispatch centers and field operators to implement interoperable protocols and procedures.

Task: Establish a Joint Users group comprised of a representative from each agency to develop policies that govern the operation and configuration of the communications system.

Objective #2: Build a communications infrastructure to support licensed interoperable and reliable communications for all agencies within the County. Share current assets and future resources as funding becomes available.

Strategy: Integrate existing equipment into expanded County microwave system as backbone for transport. Use established communications sites.

Task: Expand the County microwave system to include Ripon and Clements Fire Districts to improve radio coverage in the north and south county areas.
COMPLETED.

Task: Replace the City of Manteca communications tower to meet the need to host additional equipment supporting radio interoperability.
COMPLETED.

Task: Establish a new communication site using the City of Stockton's facilities.

Objective #3: Expand and complete Low Level Digital System

Task: Add Sheriff Channel 4 to existing low level digital system.

Task: Upgrade Sheriff Channel 5 to existing low level digital system.

Task: Upgrade three (3) Sheriff's Custody Channels to low level digital system.

Task: Add Farmington, Lodi, and Manteca communications sites to the low level digital system design.

Task: Add the City of Stockton's 10 UHF 450mhz channels to the low level sites.

Objective #4: Upgrade County Public Safety field equipment to digital equipment and establish standards for integration into trunked 450mhz radio system.

Task: Purchase equipment that meets the FCC mandates (Project 25) for bandwidth requirements.

Task: Add City of Manteca to the system

Task: Add City of Ripon to the system

Task: Add City of Tracy to the system .

Task: Add City of Lathrop to the system.

Task: Add City of Lodi to the system.

Task: Add City of Escalon to the system.

Task: Add 13 Rural Fire Districts to the system.
Add City of Lathrop Fire Department.
Add City of Manteca Fire Department.
Add City of Lodi Fire Department.
Add City of Tracy Fire Department.

Task: Upgrade the City of Stockton's equipment to trunking technology.

Objective #5: Establish a 450mhz radio frequency spectrum scaleable to 6.25khz as the digital radio platform for migration to an interoperable system.

Task: Establish a 450mhz trunked low level radio system backbone.

Task: Upgrade existing field equipment to trunking technology.

Task: Transition agencies that operate on 150mhz (VHF) to 450mhz (UHF).

Task: Add digital trunking capability to the low level sites developed in Objective #2.

Task: Upgrade field equipment as necessary to become interoperable through integration in the trunked system.

Task: Upgrade two existing mountain top repeaters to digital standards as a backup for the low level sites.

FUNDING CONSIDERATIONS AND CONCLUSION

Multiple funding sources are being accessed for implementation of the Master Communications Plan. Local jurisdictions are already contributing through their general fund budgets. Congressional appropriations are being sought through the Federal representatives of local jurisdictions. Elements of the Master Plan will be implemented through Homeland Security Grants. Past Homeland Security grants have provided additions to the low level digital communications system and digital capable field equipment. Agency inventories are included in "Attachment A".

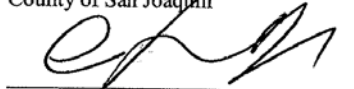
All agency representatives listed below approve and accept the Master Radio Communications Plan in concept and agree to take the plan to their governing bodies for approval.



Clark Bennett
Director of Information Systems
County of San Joaquin



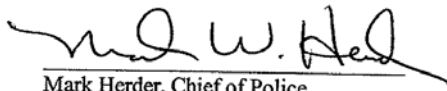
Steve Moore, Assistant Sheriff
County of San Joaquin



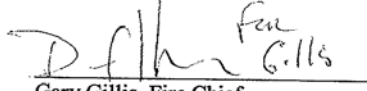
Charles Halford, Chief of Police,
City of Manteca



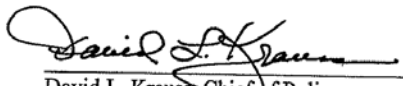
George Quaresma, Fire Chief
City of Manteca



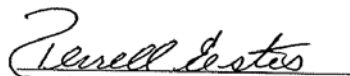
Mark Herder, Chief of Police
City of Stockton



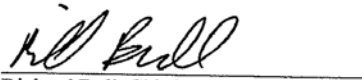
Gary Gillis, Fire Chief
City of Stockton




David L. Krauss, Chief of Police
City of Tracy



Terrell Estes, Fire Chief
City of Tracy

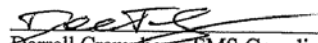


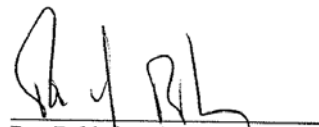
Richard Bull, Chief of Police
City of Ripon

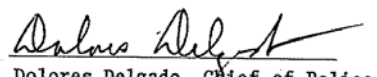


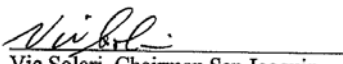
Dennis Bitters, Fire Chief
City of Ripon


All agency representatives listed below approve and accept the Master Radio Communications Plan in concept and agree to take the plan to their governing bodies for approval.

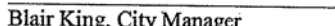

Darrell Crampton, EMS Coordinator
County of San Joaquin

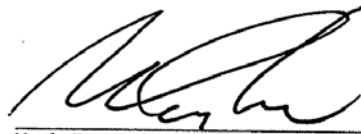

Ron Baldwin, Director
Office of Emergency Services
County of San Joaquin


Dolores Delgado, Chief of Police
City of Lathrop


Vic Solari, Chairman San Joaquin
County Joint
Radio Users Authority


Douglas Dunford, Chief of Police
City of Escalon


Blair King, City Manager
City of Lodi


Mark E. Lewis, City Manager
City of Stockton

All agency representatives listed below approve and accept the Master Radio Communications Plan in concept and agree to take the plan to their governing bodies for approval.

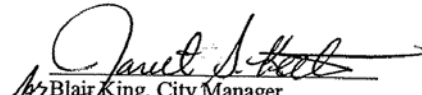
Darrell Cramphorn, EMS Coordinator
County of San Joaquin

Ron Baldwin, Director
Office of Emergency Services
County of San Joaquin

David Levesey, Chief of Police
City of Lathrop

Vic Solari, Chairman San Joaquin
County Joint
Radio Users Authority

Douglas Dunford, Chief of Police
City of Escalon



Blair King, City Manager
City of Lodi

ATTACHMENT A

Equipment Inventory

| <u>Agency</u> | <u>Portables</u> | <u>Mobiles</u> |
|------------------------|------------------|----------------|
| County of San Joaquin | 600 | 120 |
| City of Stockton | 600 | 365 |
| City of Manteca Police | 110 | 60 |
| City of Manteca Fire | 35 | 30 |
| City of Tracy Police | 99 | 40 |
| City of Tracy Fire | 60 | 46 |
| City of Ripon Police | 30 | 30 |
| City of Lathrop Police | 22 | 15 |
| City of Lathrop Fire | 15 | 20 |
| City of Lodi Police | 100 | 65 |
| City of Lodi Fire | 35 | 20 |
| Waterloo Morada Fire | 9 | 9 |
| Liberty Fire | 15 | 10 |
| Mokelumne Fire | 12 | 8 |
| Farmington Fire | 11 | 8 |
| Ripon Fire | 33 | 20 |
| Montezuma Fire | 12 | 9 |
| Escalon Fire | 15 | 12 |
| Woodbridge Fire | 20 | 17 |
| Thornton Fire | 15 | 7 |
| French Camp Fire | 5 | 4 |
| Collegeville Fire | 5 | 3 |
| Linden Peters Fire | 21 | 10 |
| Clements Fire | <u>12</u> | <u>9</u> |
| Totals: | 1,891 | 937 |

Glossary:

Association of Public Safety Communications Officials International (APCO)

Common Air Interface – (CAI) standard specifies the type and content of signals transmitted by compliant radios. One radio using CAI should be able to communicate with any other CAI radio, regardless of manufacturer.

Conventional Radio System – Non-trunked radio system, similar to telephone party-line in that the user determines availability by listening for an open channel.

Coverage -- The geographic area included within the range of, or covered by, a wireless radio system. Two systems cannot be made compatible through patching unless the coverage areas overlap.

Data Security -- Generic term designating methods used to protect data from unauthorized access (e.g., encryption).

Digital Modulation Technique -- Technique for placing a digital data sequence on a carrier signal for subsequent transmission through a channel.

Federal Communications Commission -- A board of Commissioners, appointed by the President, having the power to regulate wire and radio telecommunications in the United States.

FCC Federal Registration Number (FRN) --A unique agency identifier used for FCC frequency coordination.

Frequency Division Multiple Access (FDMA) -- A channel access method in which different conversations are separated onto different frequencies. FDMA is employed in narrowest bandwidth, multiple-licensed channel operation.

Interoperability Standards -- Established protocols that provide common interface.

Mobile Data Computer or Terminal (MDC or MDT) – Small computer system usually installed in a patrol car that allows the officer to receive and transmit a limited range of information between the officer and communications center.

Mutual Aid Channel -- A national or regional channel that has been set aside for use only in mutual aid interoperability situations, usually with restrictions and guidelines governing usage.

National Association of State Telecommunications Directors (NASTD)

National Communications System (NCS)

National Telecommunications and Information Administration -- The Federal agency responsible for domestic and international telecommunications policy.

NPSPAC Guidelines -- National Public Safety Planning Advisory Committee's nationwide public safety plan in the United States for the 821-824 MHz and 866-869 MHz bands.

Patch -- A control center subsystem that permits a mobile or portable radio on one channel to communicate with one or more radios on a different channel through the control center console.

Project 25 Standards -- A joint government/industry standards-setting effort to develop technical standards for the next generation of public safety radios, both voice and data.

Public Safety Organization -- A Federal, State, or local organization that has been given, by law, the responsibility for protecting life, property, and natural resources (e.g., law enforcement agencies, fire departments, or emergency medical service providers).

Public Service Organization -- A Federal, State, or local organization that helps furnish, maintain, and protect the infrastructures (e.g., highways and utilities) that promote the public's safety and welfare.

Re-farming -- An FCC effort to develop a strategy for using private land mobile radio (PLMR) spectrum allocations more effectively so as to meet future communications requirements. This is to be accomplished primarily by dividing channel bandwidths (i.e., narrow banding).

Relay -- Base station receiver that typically receives signals on one frequency processes and retransmits out on another frequency in order to extend talk out range.

Spectrum -- The usable radio frequencies in the electromagnetic distribution. Specific frequencies have been allocated to the public safety community. They include:

Low VHF 25-50 MHz
High VHF 150-174 MHz
Low UHF 450-470 MHz
UHF TV Sharing 470-512 MHz
800 MHz 806-869 MHz

Specialized Mobile Radio System (SMRS) -- A radio system in which licensees provide land mobile communications services in the 800 MHz and 900 MHz bands on a commercial basis.

Talk group -- A subgroup of radio users who share a common functional responsibility and, under normal circumstances, only coordinate actions among themselves and do not require radio interface with other subgroups.

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Trunked Radio System -- A system that integrates multiple channel pairs into a single system. When a user wants to transmit a message, the trunked system automatically selects a currently unused channel pair and assigns it to the user, decreasing the probability of having to wait for a free channel for a given channel loading.

Voice Security -- Over the air audio that is unintelligible or inaccessible without appropriate means of decoding.